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10/561,825	12/22/2005	Moshe Rakhman	0-05-213	3527
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KEVIN D. MCCARTHY			EXAMINER	
ROACH BROWN MCCARTHY & GRUBER, P.C.			LENIHAN, JEFFREY S	
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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b>	<b>Applicant(s)</b>
	10/561,825	RAKHMAN ET AL.
	<b>Examiner</b>	Art Unit Jeffrey Lenihan 1796

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If no period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### **Status**

- 1) Responsive to communication(s) filed on 08/12/2008.
- 2a) This action is FINAL.      2b) This action is non-final.
- 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### **Disposition of Claims**

- 4) Claim(s) 1-31 and 33-41 is/are pending in the application.
  - 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) Claim(s) \_\_\_\_\_ is/are allowed.
- 6) Claim(s) 1-31 and 33-41 is/are rejected.
- 7) Claim(s) \_\_\_\_\_ is/are objected to.
- 8) Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### **Application Papers**

- 9) The specification is objected to by the Examiner.
- 10) The drawing(s) filed on \_\_\_\_\_ is/are: a) accepted or b) objected to by the Examiner.
 

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### **Priority under 35 U.S.C. § 119**

- 12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
  - a) All    b) Some \* c) None of:
    1. Certified copies of the priority documents have been received.
    2. Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
    3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### **Attachment(s)**

- 1) Notice of References Cited (PTO-892)
- 2) Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) Information Disclosure Statement(s) (PTO/06/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_
- 5) Notice of Informal Patent Application
- 6) Other: \_\_\_\_\_

**DETAILED ACTION**

1. This action is responsive to the amendment filed on August 12, 2008.
2. The objections and rejections not addressed below are deemed withdrawn.
3. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office Action.

***Claim Rejections - 35 USC § 102***

4. Claims 24, 25, 28-30, and 36-38 are rejected under 35 U.S.C. 102(b) as being anticipated by Bernhard Rustige GmbH & Co KG, DE4402943.

The rejection stands as per the reasons set forth in the previous Office Action, incorporated herein by reference.

5. Regarding the newly added limitation that the process of claim 1 by which the thermoplastic vulcanizate of the instant claims is prepared does not require the addition of water for the steps of grafting and cross-linking of the organic silane groups; the examiner notes that claims 24 and 25 are written in product-by-process format and are drawn to the composition produced by the process of claim 1; the remaining listed claims are singularly dependent from either claim 24 or claim 25 and therefore are also product-by-process claims. As discussed in paragraphs 7-17 of the previous Office Action, the polymer composition of DE4402943 comprises a matrix phase component and a silane cross-linked dispersed phase component, corresponding to the matrix and dispersed phases of the composition of the instant application, which are combined in similar ratios compared to the composition of the instant application.

6. As stated in MPEP 2113 [R-1], "[E]ven though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process." In re Thorpe, 777F.2d 695, 698, 227 USPQ 964, 966 (Fed. Cir. 1985). It is therefore incumbent upon the applicant to prove that the recited limitations of the instant claims would not be inherently present in the polymer composition of DE4402943.

***Claim Rejections - 35 USC § 103***

7. Claims 26, 27, 34, 35, 40, and 41 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bernhard Rustige GmbH & Co KG, DE4402943.

The rejection stands as per the reasons set forth in the previous Office Action, incorporated herein by reference.

8. Regarding the newly added limitation that the thermoplastic vulcanizate is prepared via a process that does not require the addition of water; the instant claims are singularly dependent on either claim 24 or claim 25 and are therefore product-by-process claims directed towards the composition produced according to the process described in claim 1, as discussed in paragraphs 5-6 of this Office Action. As the patentability of the product does not depend on its method of production, it is incumbent

upon the applicant to demonstrate that the recited limitations are not obvious variants of the composition disclosed by DE4402943 as stated in the previous Office Action.

9. Claims 31 and 39 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bernhard Rustige GmbH & Co KG, DE4402943, in view of Coran et al, US4183876.

The rejection stands as per the reasons set forth in the previous Office Action, incorporated herein by reference.

10. Regarding the newly added limitation that the thermoplastic vulcanizate is prepared via a process that does not require the addition of water; the instant claims 31 and 39 depend from claims 24 and 25, respectively. The instant claims are therefore product-by-process claims directed toward the composition produced according to the process described in claim 1, as discussed in paragraphs 5-6 of this Office Action. As the patentability of the product does not depend on its method of production, it is incumbent upon the applicant to demonstrate that the recited limitations are not obvious variants of the composition disclosed by DE4402943 as stated in the previous Office Action.

11. Claims 1-4, 6-17, 19-21, and 33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bernhard Rustige GmbH & Co KG, DE4402943 in view of Tsumura et al, US5623030.

12. The instant claims are directed towards a process of preparing a thermoplastic vulcanizate comprising a matrix component and a silane cross-linked disperse phase component, wherein the cross-linking reaction is performed using a catalyst which comprises an acid and the steps of grafting and cross-linking an organic silane do not require the addition of water.

13. As stated in paragraphs 7-26 of the previous Office Action, DE4402943 discloses a polymeric working material which is a two-phase thermoplastic material (claim 1) prepared by mixing 20-65% by weight, based on the total polymer composition, of a non-cross-linkable (claim 16) polypropylene matrix component (claims 8-11) and 35-80% by weight (claim 13) of a silane grafted (claim 17) polyethylene disperse component which may be prepared in an extruder (claims 6, 7, 20, 21). Said polyethylene component may have a density in the range of 0.88-0.99 g/cm<sup>3</sup> (claim 12), and is grafted with an organic silane such as vinyltrimethoxysilane (VTMOS) (claim 2) through the use of a radical donor, such as an organic peroxide. Cross-linking may be performed using a catalytic agent such as an organic acid or amine (claims 1, 3), and may produce disperse phase having a gel content of 60-95% (claim 33). The composition of DE4402943 may comprise further additives (claim 15). Residues of volatile components are removed by degassing (claim 19).

14. DE4402943 does not state that the step of grafting the organic silane to the disperse phase component does not require the addition of water; however, the examiner takes the position that this limitation is inherently met. As noted above, DE4402943 discloses the use of organic peroxides to graft VTMOS to the ethylene

disperse phase component. The examiner notes that applicant recites the grafting of organic silanes such as VTMOS through the use of organic peroxides. As the process of DE4402943 discloses the grafting of the same organic silane using the same radical donors as the instant application, the examiner takes the position that grafting step of the process of DE4402943 inherently does not require water (claim 1).

15. DE4402943 does not recite the use of 0.05 to 5 parts by weight (pbw) of cross-linking agent per 100 parts of the polymer composition (claim 14), the specific acid catalysts recited in the instant claims (claims 3, 4), or that the cross-linking reaction does not require the addition of water (claim 1).

16. As noted in paragraphs 30-31 of the previous Office Action, Tsumura discloses the silane cross-linking of polymers containing trialkoxysilane groups through the use of 0.01-20 pbw per 100 parts of the polymer (claim 14) of a catalyst such as boric acid or an organic acid such as trifluoromethanesulfonic acid (claims 3, 4). Tsumura further recites that, while water may be added as an accelerator for the cross-linking reaction, it is not required.

17. Both DE4402943 and Tsumura describe the cross-linking of polymers through the use of trialkoxysilane groups. As taught by Tsumura, it was known in the art to use boric acid as a catalyst for the cross-linking of trialkoxysilane groups without the addition of water. As DE4402943 discloses that acids may be used as catalysts for the cross-linking of the dispersed phase component of the polymer composition, the examiner takes the position that it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the process described in DE4402943 via the

addition of an inorganic or organic acid catalyst during the cross-linking reaction. As taught by Tsumura, water is not required for the acid-catalyzed cross-linking of trialkoxysilane groups; the examiner therefore takes the position that the modified process of DE4402943 using an inorganic acid or organic acid as a cross-linking catalyst would inherently meet the limitation that water would not be required for the cross-linking reaction to occur.

18. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Bernhard Rustige GmbH & Co KG, DE4402943, and Tsumura, US5623030, as applied to claim 4 above, in view of Joffre et al, US5840800. Neither DE4402943 nor Tsumura discloses the combination of triethanolamine and adipic acid as a catalyst.

19. As discussed in paragraphs 32-33 of the previous Office Action, Joffre teaches the use of carboxylic acid compounds, bases such as triethanolamine (claim 5), and combinations thereof as catalysts for cross-linking of silicon modified polymers.

20. As previously discussed, DE4402943 discloses the use of (organic) acids and bases in the catalysis of the cross-linking of a trialkoxysilane-modified disperse phase component. As Joffre generically discloses the use of combinations of amines, including triethanolamine with carboxylic acids without criticality as a suitable catalyst for cross-linking of silanol groups, the examiner takes the position that the use of adipic acid with the disclosed amines as the cross-linking agent described in DE4402943 would have been obvious to one of ordinary skill in the art.

21. Claim 18 is rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Bernhard Rustige GmbH & Co KG, DE4402943, and Tsumura, US5623030, as applied to claim 1 above, in view of Deguchi et al, US4558094.

22. As discussed in paragraphs 34-37 of the previous Office Action, Deguchi discloses compositions produced by blending silane-grafted polypropylene with an ethylene resin and ethylene/α-olefin which are both modified with silane functional groups, followed by cross-linking with a silanol cross-linking agent; said compositions are characterized by improvements in properties such as heat resistance and impact strength.

23. DE4402943 discloses a motivation for the stabilization of the polyethylene disperse phase within the polypropylene matrix. As it was known in the art to cross-link blends of silane-grafted polypropylene and silane-grafted polyethylene polymers, resulting in improved properties for the final product, the examiner takes the position that it would have been obvious to one of ordinary skill in the art to perform the silane-grafting reaction disclosed in DE4402943 at a temperature at which all components of the mixture would be molten. Doing so would allow for grafting of the alkoxy silane functional groups on the polypropylene as well as the polyethylene component, allowing for a degree of cross-linking between the two which would further stabilize the dispersion of the polyethylene particles within the polypropylene matrix and improving the properties of the polymeric working material.

24. Claims 22 and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Bernhard Rustige GmbH & Co KG, DE4402943, and Tsumura et al, US5623030, as applied to claims 6 and 7 above, in further view of Topcik, US4873042. The instant claims recite processes by which the TPVs of the instant application are prepared in batch mode (claim 22) and continuous mode (claim 23).

25. As noted in the previous Office Action, DE4402943 discloses both batch mode (claim 22) and continuous mode (claim 23) production of two-phase working materials which are equivalent to the TPVs of the instant application. The combination of DE4402943 and Tsumura does not disclose the addition of an antioxidant to the mixture to neutralize the peroxide utilized as a grafting catalyst, thereby stopping that reaction.

26. Topcik teaches a process for extruding a thermoplastic polymer, in which silane-grafted polyethylene is prepared and cross-linked. Topcik discloses that 1, 3-dihydro-2, 2, 4-trimethylquinoline, an antioxidant, is added to the grafting reaction to act as a radical trap, thereby regulating the degree to which the reaction takes place (Column 3, lines 5-34). Inherent in the disclosure of DE4402943 is the intention to minimize and/or prevent the occurrence of grafting of silane functional groups onto the polymeric chains of the matrix component. The grafting reaction is performed at a temperature at which the matrix component will not be in the molten state for the specific purpose of avoiding this reaction. The examiner therefore takes the position that it would have obvious to one of ordinary skill in the art at the time of the invention to add an antioxidant to the mixture disclosed by DE4402943 to serve as a radical trap, as taught by Topcik, as a

means to further reduce the occurrence of undesired side reactions between silane compounds and the matrix component once the temperature was raised and the matrix became molten.

***Response to Arguments***

27. Applicant's arguments filed August 12, 2008 have been fully considered but they are not persuasive.
28. Regarding the rejections of claims 24-31 and 34-41; applicant has amended the independent claim to recite the limitation that the steps of grafting and cross-linking of the organic silane groups do not require the addition of water. Applicant alleges that the amended claim 1 renders claims 24-31 and 34-41 patentable. As noted previously in this Office Action, the instant claims are written in product-by-process format, and are therefore directed towards the composition produced by the process recited in claim 1. As no evidence has been provided that demonstrates that the limitations recited in the instant claims are neither inherent in nor obvious over the composition disclosed in DE44032943, the rejections are maintained.
29. Regarding the rejections under 35 U.S.C. 103(a); applicant argues that the process of the instant application provides for the production of thermoplastic vulcanizates characterized "by the use of a cross-linking agent comprising an acid, and the absence of water addition." Applicant states that the combination of these conditions allows for "almost full cross-linking of the disperse phase (above 95%) within a short

time." Applicant further argues that one of ordinary skill would not have a motivation to choose a water-free process or an organic acid catalyst.

30. Regarding the choice of an organic acid catalyst, the examiner notes that DE4402943 states that the cross-linking reaction may take place via "the addition of other catalytic agents, which shift the pH-value of the wetting solution into the acid or alkali region. Such suitable materials can be organic acids or bases" (page 7, lines 26-28). The examiner notes that DE4402943 explicitly describes these organic acids and bases as "catalytic agents." As noted above, Tsumura teaches the use of organic acids such as trifluoromethanesulfonic acid as a catalyst for the cross-linking of trialkoxysilane groups. As DE4402943 teaches the generic use of organic acids in the catalysis of the cross-linking reaction, the examiner takes the position that it would have been obvious to one of ordinary skill in the art to use trifluoromethanesulfonic acid, a known catalyst for silane cross-linking, as the organic acid disclosed by DE4402943, resulting in a process in which the cross-linking reaction does not require water. The examiner further notes that the independent claim only requires that the cross-linking agent comprises an acid; the claim does not require that an organic acid is used.

31. In response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., the absence of water addition, a short period of time) are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

32. The examiner notes that the claims as written recite only that the grafting and cross-linking reactions do not require the addition of water to take place. The examiner therefore takes the position that the mere presence of water in the process(es) disclosed by the references is irrelevant; as noted above, Tsumura discloses that, while water may be added to act as an accelerator for the cross-linking reaction, it is not required to add water. The addition of the (in)organic acid catalysts taught by Tsumura to a trialkoxysilane-containing polymer results in a system wherein the cross-linking of the silane groups does not require the addition of water to proceed.

33. The examiner notes that the claims as written do not require a specific period of time in which the cross-linking reaction must be completed. As currently written, the claims read on any processes of preparing a thermoplastic vulcanizate via the recited steps, regardless of whether the process is completed over a period of minutes or ours, as described in Tsumura.

34. Applicant further argues that the results of the claimed process, i.e. nearly full cross-linking in a time period of 1-5 minutes, would be unexpected in view of the applied references. While the results may be unexpected, the examiner takes the position that the scope of the allegedly unexpected results is not commensurate in scope with the invention as claimed.

35. The independent claim as written is directed only towards a process of preparing a thermoplastic vulcanizate comprising a matrix component and a cross-linked disperse phase component; there is no requirement that a specific level of cross-linking be achieved. The examiner therefore takes the position that the claim reads on any

process of preparing a thermoplastic vulcanizate having a cross-linked disperse phase via the recited steps regardless of the level of cross-linking achieved. The examiner also notes that there is no ratio of grafted organic silane to disperse phase component recited in the instant claims which is required to achieve a desired level of cross-linking.

36. As argued by the applicant in the filed remarks, the process of the invention requires a weight ratio of cross-linking agent to silane from 1:3 to 1:1. The examiner notes that this ratio is not recited in the instant claims; rather the claimed invention reads on a process using any weight ratio of cross-linking agent to silane. Furthermore, the independent claim recites "a cross-linking agent comprising an acid" and encompasses the use of mixtures of cross-linking agents, with the proviso that at least one component is an acid. Applicant's remarks are directed towards the use of an organic acid as a cross-linking agent. It is therefore unclear as to whether the same results would be achieved using a cross-linking agent comprising a mixture of an acid and a second compound.

### ***Conclusion***

37. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

38. A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within

TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jeffrey Lenihan whose telephone number is (571)270-5452. The examiner can normally be reached on Monday through Thursday from 7:30-5:00 PM, and on alternate Fridays from 7:30-4:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, James J. Seidleck can be reached on 571-272-1078. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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